

**USDA
NATURAL RESOURCES
CONSERVATION SERVICE**

**MARYLAND CONSERVATION
PRACTICE STANDARD**

**WATER AND SEDIMENT CONTROL
BASIN (WASCOB)**

**CODE 638
(Reported by No.)**

DEFINITION

An earth embankment or a combination ridge and channel generally constructed across the slope and minor water courses to form a sediment trap and a water detention basin.

PURPOSE

To reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, improve downstream water quality, and improve farmability of sloping land.

**CONDITIONS WHERE PRACTICE
APPLIES**

This practice applies to all sites where:

1. Topography is generally irregular.
2. Gully or ephemeral erosion is present in cropland.
3. Sheet and rill erosion levels are reduced in the watershed by other conservation practices, and the basin is part of a planned conservation system.
4. Runoff and sediment cause damage.
5. Soil and site conditions are suitable.
6. Adequate outlets are available.

Water and Sediment Control Basins must not be used as a substitute for grade control, structures for water control or sediment control on untreated watersheds. Reference Maryland conservation practice standard Grade Stabilization Structures, Code 410, Sediment Basin, Code 350, or Structure for Water Control, Code 587 to control erosion at the outlet of the water course. Where a ridge and/or channel extend beyond the detention basin or level embankment, standards for Terraces, Code 600 or Diversion, Code 362 must be applied as appropriate.

CONSIDERATIONS

Water and sediment control basins are part of a planned resource management system including such practices as terraces, contouring, a conservation cropping system, conservation tillage, and crop residue management.

Effects on streams and wetlands must be considered. Mitigation may be required where water is diverted or degraded for downstream uses.

The design should enhance habitat for native and endangered species. Effects on downstream water quality and temperature may be critical for some species.

CRITERIA

General

Water and sediment control basins can be part of the treatment needed to protect the soil resource base. Other practices such as terraces, contouring, conservation cropping system, conservation tillage, and crop residue management should be used to control erosion.

Do not use water and sediment control basins in lieu of terraces. When a ridge and channel extend beyond the detention basin or level embankment, design the practice or system as a terrace.

The planned conservation management system should reduce sheet and rill erosion in the watershed to minimize operation and maintenance requirements.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Spacing

Water and sediment control basins generally are spaced at terrace intervals. Evaluate the grade between basins and set the spacing to prevent watercourse or gully erosion.

Limit the drawdown time for each basin so that the duration of flooding, infiltration, or seepage control does not damage crop. The maximum drawdown time for cropland is 24 hours and 48 hours for pastureland.

Locate basins to accommodate farm machinery widths. Evaluate land slope, embankment slope lengths, top widths, and inlet and outlet locations when determining spacing.

Water and sediment control basins can be used as part of a terrace system to control small watersheds. The maximum uncontrolled drainage area to each basin is 30 acres.

Alignment

To permit contouring as near as possible, the embankment orientation and row direction should be approximately perpendicular to the land slope. The arrangement should permit farming without excessive short point rows or sharp curves. Field boundaries and row lengths should also be considered when determining basin location and row direction.

Cross-Section

Embankments may consist of a broad base with flat slopes (both slopes are cropped), a steep backslope (front slopes are cropped backslopes are grassed), or narrow base (both slopes are grassed). The combined upstream and downstream side slopes of the settled embankment must not be less than five horizontal to one vertical (5:1) with neither slope steeper than 2:1. The steepest farmable slope is 5:1. The minimum top width of the embankment is shown in Table 1.

Table 1	
Top Widths Based on Fill Height	
Fill height (ft)	Effective top width (ft)
0 - 5	3
5 - 10	6
10 - 15	8

Increase the design height of the embankment at least 5% to allow for settlement. The maximum settled height is 15 feet measured from the natural ground at the centerline of the embankment to the top of the dam.

Foundation cutoff and seepage control

Portions of structures designed to impound water must include foundation cutoff and seepage control as required by the Maryland conservation practice standard Pond, Code 378.

Capacity

Design the capacity of the basin to control the runoff from a 10-year, 24-hour frequency storm event by passing and routing the design storm through an underground outlet without overtopping the basin or creating emergency spillway flow. Basins providing flood protection or to function with other structures need to be designed to control the storm frequency consistent with the potential hazard or requirement.

Increase the storage capacity of the basin to contain the anticipated 10-year sediment accumulation, unless provisions are made for periodic sediment removal from the basin to maintain the design capacity and the landowner agrees to this provision in the operation and maintenance plan.

End Closures

End closures may be necessary to obtain the design capacity. A maximum 0.5-ft of freeboard may be added to the design height to provide for a token emergency spillway around one or both ends of the basin. A token emergency spillway is generally a good idea to protect the embankment and piping system during larger than designed for storm events.

Outlets

Water and sediment control basins require an underground outlet, which does not discharge onto cropland. The underground outlet must meet the requirements for Maryland conservation practice standard Underground Outlets, Code 620.

Vegetation

Establish suitable erosion resistant vegetation on all slopes and disturbed areas that are not to be farmed. When selecting the species of vegetation,

consider the environmental quality desired and wildlife needs such as food and habitat. Comply with Maryland conservation practice standard Critical Area Planting, Code 342, for seedbed preparation and seeding, fertilizing, and mulching rates.

SPECIFICATIONS

Plans and specifications for installing water and sediment control basins will be in keeping with this standard and describe the requirements for applying the practice to achieve its intended purpose.

Use clean fill material, free of sod, roots, organic material, and stones larger than six- (6) inches or other objectionable material. Place fill approximately horizontal lifts no greater than six- (6) inches prior to compaction. Compact each lift using excavation equipment or equivalent. Require at least two (2) passes of compaction equipment over each lift. Fill material shall have a moisture content that will allow a ball of soil to hold together when squeezed by hand. Do not use frozen fill material or place fill on a frozen foundation.

Stockpile and replace all topsoil in excavation and fill areas. Cuts and fills should be made in a manner that enhances the topography. Excessive cuts, to secure borrow to build the basin ridge through depressions, should be avoided. Borrow, when taken from adjacent ridges, should level the field and improve farmability.

OPERATION AND MAINTENANCE

Provide a written operation and maintenance plan for each planned practice in a conservation system. Include in the plan for the water and sediment control basins, the embankment, design capacity, vegetative cover, and the outlet. Maintenance should include provisions for inspection of outlets, and embankments after each storm event. Any damage to the basin should be corrected as soon as possible to prevent major damages.

In the O&M plan, specify the maintenance interval necessary to maintain the sediment design capacity by cleaning the basin or, where practical, by raising the embankment height. Place excavated sediment on cropland or the embankment to enhance topography and maintain fertility. Maintain the vegetation on the embankment to prevent sheet and rill erosion or gullyng. Trees, woody cover, and borrowing animals generally create problems on embankments and should be controlled.

SUPPORTING DATA AND DOCUMENTATION

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. Plan view sketch;
2. Profile and cross-section of the embankment, land slope, profile of the outlet, and other pertinent data if needed.
3. Special control or field features that must be considered in the design.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see chapter 5 of the EFH, Part 650. The following is a list of the minimum required design data:

1. Locate practice on farm plan map in the case file;
2. Plan view including, location map, all system components, material, utility notification, and construction specifications;
3. Determine soil type, and any special restrictions. Provide soil loss calculations;
4. Design computations using the appropriate Engineering Field Handbook Chapter, Part 650 or by other approved method;
5. Show job class on plan;
6. Cross-sections and profiles of the basin to be shown on plans.
7. Estimated quantities;
8. Details of outlet protection or other structural components needed;
9. Vegetative plan. This must meet the criteria, specifications, and documentation requirements of the Maryland conservation practice standard for Critical Area Planting, Code 342. Show on plan;
10. Written Operation and Maintenance plan.

Construction Check Data/As-Built

Record on survey notepaper, SCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted on plans in red. The following is a list of minimum data needed for As-builts:

1. Documentation of site visits on CPA-6. Include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom;
2. Record check notes during or after completion of construction showing grades and cross section of constructed components and outlets including length, width and depth;
3. Statement on seeding;
4. Final quantities and documentation for quantity changes, and materials certification;
5. Sign and date checknotes and plans by someone with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice Standards.

REFERENCES

1. Maryland Department of Environment, 1994 *Maryland Standard and Specifications for Soil Erosion and Sediment Control*.
2. Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, Baltimore, Maryland, January 2001.
3. USDA, Natural Resources Conservation Service, *Maryland Field Office Technical Guide, Section IV, Standards and Specifications*.
4. USDA Natural Resources Conservation Service, *National Engineering Handbook*, Part 650, various chapters.
5. USDA Natural Resources Conservation Service, *National Handbook of Conservation Practices*.